CLAIMS

1. Method for diagnosing operating states (36,38,40,42) of a synchronous pump in a liquid circuit, particularly in a dishwasher or similar, **characterised in that** the alternating voltage (U) applied to the pump motor and the alternating current (I) of the motor are measured in at least one measurement step (30), in that the extent of a phase shift () between the alternating voltage (U) and the alternating current (I) is measured at at least one point in time in a determination step (32), the phase shift () or the chronological progression thereof being determined from the recorded measured values, and a characteristic of the phase shift () or of its chronological progression is determined, and in that the determined characteristic is assigned to a predetermined pump operating state (36,38,40,42) in an assignment step (34).

2. The method of claim 1, **characterised in that** the extent of the phase shift () in the assignment step (34) is assigned to a predetermined phase shift value range linked to a pump operating state (36,38,40,42), particularly the "low water level" state.

3. The method of claim 1, **characterised in that** in the determination step (32), the difference between the measured extent of the phase shift (2) and a saved predetermined phase shift (1) is determined, and in that in the assignment step (34), the difference in phase shift determined in this way is assigned to a predetermined pump operating state (36,38,40,42).

4. The method of claim 1, **characterised in that** in the determination step (32), the extent of the phase shift () between the alternating voltage (U) and the alternating current (I) is determined at different times, the chronological progression of the phase shift () is determined from the recorded measured values and a characteristic of the chronological progression of phase shift () is determined, and in that the determined characteristic is assigned to a predetermined pump operating state (36,38,40,42) in the assignment step (34).

5. The method of claim 4, **characterised in that** in the assignment step (34), the determined characteristic is assigned to a predetermined characteristic value range linked to a pump operating state (36,38,40,42).

6. The method of claim 5, **characterised in that** in the determination step (32), the extent of the slope (S1,S2) of the chronological progression of phase shift () is determined, and in that in the assignment step (34), the determined extent of slope (S1,S2) is assigned to a predetermined slope value range linked to a pump operating state (36,38,40,42).

7. The method of claim 4, **characterised in that** the determination step (32) comprises a transformation step in which the chronological progression of the phase shift is subjected to a Fourier transform and the amplitude of the Fourier transform in a predetermined frequency range is determined, and in that in the following assignment step (34), the determined amplitude is assigned to a predetermined amplitude value range linked to a pump operating state (36,38,40,42).

8. The method of claim 7, **characterised in that** the Fourier transform is a discrete Fourier transform (DFT) or a fast Fourier transform (FFT).

9. The method of one of claims 4 to 8, **characterised in that** the determination of the chronological progression of the phase shift in the determination step (32) includes sliding averaging.

10. The method of one of the preceding claims, **characterised in that** the measurement step (30) includes a conversion of the measured alternating voltage signal (U) and of the measured alternating current signal (I) into rectangular signals (U',I').

11. Device for carrying out the method according to one of the preceding claims, **characterised by** a microcontroller (10) with a timer (12), comprising a voltage inlet (14) for recording a start signal and a current inlet (16) for recording a stop signal, said voltage and current inlets (14,16) being contrived to interpret the exceeding of a predetermined voltage or current signal level as a start or stop signal, with the timer content being proportional to the chronological gap between start signal and stop signal,

said microcontroller (10) also comprising a memory (18) for saving the timer content.

12. The device of claim 11, **characterised in that** the memory (18) comprises a number of memory cells to save a sequence of memory contents.

13. The device of claim 12, **characterised in that** the microcontroller (10) comprises an evaluation unit (20) for averaging the memory contents.

14. The device of one of preceding claims 11 to 13, **characterised by** an interface for transmitting operating state-related data to a control unit for controlling the liquid circuit.